

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application.

- AI
- 1 1. (Currently Amended) An apparatus for ~~designing~~ data store assignment for
 2 a data storage system design, comprising:
 3 a data structure stored in computer-readable memory, the data structure
 4 having a plurality of nodes, at least some of the nodes each ~~corresponding to~~
 5 representing a physical data storage device having respective attributes;
 6 representations of a plurality of data stores, each data store having
 7 respective requirements; and
 8 a solver process stored in computer-readable memory for assigning the
 9 representations of data stores to the data structure based on comparisons of the
 10 attributes of the nodes to the requirements of the data stores wherein the solver
 11 process makes a first assignment of a ~~first~~ store and determines a first metric
 12 representative of how well the first assignment meets one or more goals for
 13 the data storage system and wherein the solver makes a second assignment of
 14 the ~~first~~ store and determines a second metric representative of how well the
 15 second assignment meets the one or more goals and wherein the solver selects
 16 one of the first assignment and the second assignment based on the first and
 17 second metrics.
 - 1 2. (Currently Amended) The apparatus according to claim 1, wherein the
 2 solver process compares the requirements of the ~~first~~ store to the attributes of
 3 one or more of the data storage devices and when the comparison indicates
 4 compatibility, the solver process makes the first assignment of the ~~first~~ store.
 - 1 3. (Original) The apparatus according to claim 2, wherein the plurality of
 2 nodes are arranged in a hierarchy.
 - 1 4. (Original) The apparatus according to claim 1, wherein the solver process
 2 makes at least one additional assignment of the data store.

A/ 1 5. (Original) The apparatus according to claim 4, wherein the solver process
2 selects one of the first assignment, the second assignment and the at least one
3 additional assignment based on how well goals for the data storage system are
4 met.

1 6. (Original) The apparatus according to claim 1, wherein when the solver
2 process assigns all of the stores to the data structure, the data structure
3 represents a first design for the data storage system and wherein the solver
4 determines a metric representative of how well the first design meets the one
5 or more goals for the data storage system.

1 7. (Original) The apparatus according to claim 6, wherein the solver process
2 reassigns at least one of the stores to the data structure thereby forming a
3 second design for the data storage system and wherein the solver determines a
4 metric representative of how well the second design meets the one or more
5 goals for the data storage system.

1 8. (Original) The apparatus according to claim 7, wherein the solver process
2 selects one of the first design and the second design based on the first and
3 second metrics.

1 9. (Original) The apparatus according to claim 7, wherein the solver process
2 reassigns a plurality of the stores to the data structure to form the second
3 design.

1 10. (Original) The apparatus according to claim 7, wherein the solver process
2 reassigns some of the stores to the data structure by removing all of the stores
3 assigned to a particular one of the data storage devices.

1 11. (Original) The apparatus according to claim 7, wherein the plurality of
2 nodes are arranged in a hierarchy.

12. (Original) The apparatus according to claim 1, wherein one or more of said comparisons do not indicate compatibility, the solver process modifies one or more of the attributes of one or more of the data storage devices.

13. (Currently Amended) An apparatus for ~~designing~~ data store assignment for a data storage system design, comprising:

a data structure stored in computer-readable memory, the data structure having a plurality of nodes, at least some of the nodes each ~~corresponding to~~ representing a physical data storage device and having respective attributes; representations of a plurality of data stores ~~to be assigned to the data storage system~~, each data store having respective requirements; and

a solver process stored in computer-readable memory for assigning the representations of data stores to the ~~data storage devices~~ nodes wherein the solver process compares the requirements of a ~~first one of the stores~~ store to the attributes of one or more of the data storage devices and when the comparison indicates compatibility, the solver process makes a first assignment of the ~~first~~ store and when the comparison does not indicate compatibility, the solver process modifies one or more of the attributes of one or more of the data storage devices.

14. (Original) The apparatus according to claim 13, wherein the solver process makes at least one additional assignment of the data store.

15. (Original) The apparatus according to claim 14, wherein the solver process selects one of the first assignment and the at least one additional assignment based on how well one or more goals for the data storage system are met.

16. (Original) The apparatus according to claim 15, wherein when the solver process assigns all of the stores to the data structure, the data structure represents a first design for the data storage system and wherein the solver determines a metric representative of how well the first design meets the one or more goals for the data storage system.

1 17. (Original) The apparatus according to claim 15, wherein the plurality of
2 nodes are arranged in a hierarchy.

1 18. (Currently Amended) The apparatus according to claim [15] 16, wherein
2 the solver process reassigns some of the stores to the data structure thereby
3 forming a second design for the data storage system and wherein the solver
4 determines a metric representative of how well the second design meets the
5 one or more goals for the data storage system.

1 19. (Original) The apparatus according to claim 18, wherein the solver
2 process selects one of the first design and the second design based on the first
3 and second metrics.

1 20. (Original) The apparatus according to claim 18, wherein the solver
2 process reassigns some of the stores to the data structure by removing all of
3 the stores assigned to a particular one of the data storage devices.

1 21. (Currently Amended) A method of ~~designing~~ data store assignment for a
2 data storage system design, comprising:

3 providing a data structure stored in computer-readable memory, the
4 data structure having a plurality of nodes, at least some of the nodes each
5 ~~corresponding to~~ representing a physical data storage device having respective
6 attributes;

7 providing a representation of a first data store having requirements;
8 comparing the requirements for the ~~first~~ data store to attributes of
9 devices in the data structure;

10 making a first assignment of the representation of the first data store to
11 the data structure based on results of said comparing;

12 determining a first metric for the first assignment according to how
13 well the first assignment meets one or more goals for the data storage system;

14 making a second assignment of the representation of the first data store
15 based on said results of said comparing;

AI 16 determining a second metric for the second assignment according to
 17 how well the second assignment meets the one or more goals for the data
 18 storage system; and
 19 selecting the first assignment or the second assignment based on the
 20 first and second metrics.

1 22. (Original) The method according to claim 21, wherein the plurality of
 2 nodes are arranged in a hierarchy.

1 23. (Currently Amended) The method according to claim 21, further
 2 comprising modifying the attributes of one or more of the nodes into
 3 compatibility with the requirements of the ~~first~~ data store.

1 24. (Currently Amended) The method according to claim 21, further
 2 comprising making at least one additional assignment of the ~~first~~ data store.

1 25. (Original) The method according to claim 24, wherein the solver process
 2 selects one of the first assignment, the second assignment and the at least one
 3 additional assignment based on how well goals for the data storage system are
 4 met.

1 26. (Original) The method according to claim 21, further comprising:
 2 assigning all of a plurality of additional data stores to the data structure
 3 and when said assigning all of the additional data stores is completed, the data
 4 structure represents a first design for the data storage system; and
 5 determining a metric representative of how well the first design meets
 6 the one or more goals for the data storage system.

1 27. (Original) The method according to claim 26, further comprising:
 2 reassigning some of the stores to the data structure thereby forming a
 3 second design for the data storage system; and
 4 determining a metric representative of how well the second design
 5 meets the one or more goals for the data storage system.

28. (Original) The method according to claim 27, further comprising selecting one of the first design and the second design based on the first and second metrics.

29. (Original) The method according to claim 27, said reassigning comprising removing all of the stores assigned to a particular one of the data storage devices.

30. (Currently Amended) A method ~~for designing~~ of data store assignment for a data storage system design, comprising:

- providing a data structure stored in computer-readable memory, the data structure having a plurality of nodes, at least some of the nodes each ~~corresponding to~~ representing a physical data storage device having respective attributes;
- providing representations of a plurality of data stores, each having requirements;
- comparing the requirements for each data store to attributes of devices in the data structure;
- making a first assignment of the representations of each of the plurality of stores to the data structure based on results of said comparing;
- determining a first metric for the first assignment according to how well the first assignment meets one or more goals for the data storage system;
- making a second assignment of the representations of each of the plurality of data stores based on said results of the said comparing;
- determining a second metric for the second assignment according to how well the second assignment meets the one or more goals for the data storage system; and
- selecting the first assignment or the second assignment based on the first and second metrics.

31. (Original) The method according to claim 30, wherein the plurality of nodes are arranged in a hierarchy.

A1 1 32. (Original) The method according to claim 30, wherein when said
2 comparing does not indicate compatibility, modifying one or more of the
3 nodes.

1 33. (Original) The method according to claim 32, said modifying comprising
2 expanding data storage capacity of the one or more nodes.

1 34. (Original) The method according to claim 30, said data structure further
2 comprising representations of data storage devices that can be added to a
3 design for the data storage system, but have not been added to the design.

A2 1 35. (New) The apparatus according to claim 1, wherein one or more of said
2 comparisons do not indicate compatibility, the solver process adds one or
3 more additional nodes to the data structure.

1 36. (New) The apparatus according to claim 1, wherein the solver process
2 assigns at least some of the stores to the data structure and then removes at
3 least one of the stores from the data structure.

1 37. (New) The apparatus according to claim 36, wherein the solver process
2 removes a storage device from the design when no stores are assigned to the
3 storage device.

1 38. (New) The apparatus according to claim 10, wherein the solver process
2 removes a storage device from the design when no stores are assigned to the
3 storage device.

1 39. (New) The apparatus according to claim 13, wherein the solver process
2 assigns at least some of the stores to the data structure and then removes at
3 least one of the stores from the data structure.

1 40. (New) The apparatus according to claim 39, wherein the solver process
2 removes a storage device from the design when no stores are assigned to the
3 storage device.

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1 41. (New) The apparatus according to claim 20, wherein the solver process
2 removes a storage device from the design when no stores are assigned to the
3 storage device.

1 42. (New) An apparatus for data store assignment for a data storage system
2 design, comprising:
3 a data structure stored in computer-readable memory, the data structure
4 having a plurality of nodes, at least some of the nodes each representing a
5 physical data storage device and having respective attributes;
6 representations of a plurality of data stores, each data store having
7 respective requirements; and
8 a solver process stored in computer-readable memory for assigning the
9 representations of data stores to the nodes wherein the solver process
10 compares the requirements of a store to the attributes of one or more of the
11 data storage devices and when the comparison indicates compatibility, the
12 solver process makes a first assignment of the store and when the comparison
13 does not indicate compatibility, the solver process adds one or more additional
14 nodes to the data structure.

1 43. (New) The apparatus according to claim 42, wherein the solver process
2 makes a first assignment of the store to the one or more additional nodes.
